

What Is Claimed Is:

1. A thin-film transistor comprising:

a semiconductor layer, and a source region, a drain region, and a gate region which are formed on the semiconductor layer to be separated from each other; wherein said semiconductor layer is made of composite material, and said composite material comprises organic semiconductive material and at least one kind of inorganic material particles dispersed inside the organic semiconductive material.

2. The thin-film transistor according to Claim 1, wherein an electric resistance of said inorganic material is lower than that of said organic semiconductive material, during ON operation of the thin-film transistor.

3. The thin-film transistor according to Claim 1, wherein a maximum particle diameter of said particle is smaller than a distance between said source region and said drain region.

4. The thin-film transistor according to Claim 1, wherein a content rate of said particles in said semiconductor layer is restricted so as to inhibit electrical connection by a network of said particles between said source region and said drain region.

5. The thin-film transistor according to Claim 4, wherein said content rate is more than 0 volume% and not more than 60 volume%.

6. The thin-film transistor according to Claim 1, wherein a group of said dispersed particles comprises at least first particle group and second particle group, having different average particle diameters.

7. The thin-film transistor according to Claim 6, wherein the average particle diameter of said first particle group is more than 0% and less than 15% of the average particle diameter of said second particle group.

8. The thin-film transistor according to Claim 1, wherein said inorganic material is a conductive material.

9. The thin-film transistor according to Claim 1, wherein said inorganic material is a semiconductive material.

10. The thin-film transistor according to Claim 1, wherein said inorganic material is a composite material of two or more materials containing a conductive material and a semiconductive material.

11. A method of manufacturing a thin-film transistor comprising a semiconductor layer, and a source region, a drain region and a gate region which are formed on the semiconductor layer to be separated from each other, comprising:

a first step of forming composite material by dispersing at least one kind of inorganic material particles inside an organic semiconductive material, and

a second step of forming said semiconductor layer using said composite material produced in the first step.

12. The method of manufacturing a thin-film transistor according to Claim 11, wherein an electric resistance of said inorganic material is lower than that of said organic semiconductive material, during ON operation of the thin-film transistor.

13. The method of manufacturing a thin-film transistor according to Claim 11, further comprising a step of selecting particles so as to form a predetermined particle size distribution.

14. The method of manufacturing a thin-film transistor according to Claim 11, further comprising a step of controlling dispersion so as to form a predetermined particle dispersion condition in said semiconductor layer.

15. The method of manufacturing a thin-film transistor according to Claim 11, wherein said second step further comprising, a first preparation step of dispersing said composite material in a predetermined solution dissolved or undissolved to obtain a semiconductor layer forming material, and a second preparation step of atomizing, coating, or printing said semiconductor layer forming material prepared in said first preparation step to a predetermined location, and then drying the material to form said semiconductor layer.

16. An active matrix display, wherein a plurality of the thin-film transistors according to Claim 1 are provided as switching elements for driving pixels.

17. A radio ID tag, wherein the thin-film transistor according to Claim 1 is used as a semiconductor device for forming an integrated circuit.

18. A portable device, wherein the thin-film transistor according to Claim 1 is used as a semiconductor device for forming an integrated circuit.